## Accepted Manuscript

Title: INTER vs. INTRAGLYCOSIDIC ACETAL LINKAGES CONTROL SULFATION PATTERN IN SEMI-SYNTHETIC CHONDROITIN SULFATE

Author: Antonio Laezza Cristina De Castro Michelangelo

Parrilli Emiliano Bedini

PII: S0144-8617(14)00563-3

DOI: http://dx.doi.org/doi:10.1016/j.carbpol.2014.05.085

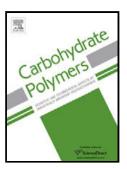
Reference: CARP 8952

To appear in:

Received date: 10-3-2014 Revised date: 16-4-2014 Accepted date: 19-5-2014

Please cite this article as: Laezza, A., De Castro, C., Parrilli, M., and Bedini, E.,INTER vs. INTRAGLYCOSIDIC ACETAL LINKAGES CONTROL SULFATION PATTERN IN SEMI-SYNTHETIC CHONDROITIN SULFATE, *Carbohydrate Polymers* (2014), http://dx.doi.org/10.1016/j.carbpol.2014.05.085

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## ACCEPTED MANUSCRIPT

#### INTER vs. INTRAGLYCOSIDIC ACETAL LINKAGES CONTROL SULFATION PATTERN

IN SEM	I_SVNTHETIC	<b>CHONDROITIN</b>	SULFATE

3

4

5

6

1

2

Antonio Laezza, Cristina De Castro, Michelangelo Parrilli, Emiliano Bedini<sup>1</sup>

Dipartimento di Scienze Chimiche, Università di Napoli "Federico II",

Complesso Universitario Monte S.Angelo, via Cintia 4, I-80126 Napoli, Italy

7

8

9

10

11

12

13

14

15

16

17

18

19

#### Abstract

Microbial-sourced unsulfated chondroitin could be converted into chondroitin sulfate (CS) polysaccharide by a multi-step strategy relying upon benzylidenation and acetylation reactions as keysteps for its regioselective protection. By conducting the two reactions *one-* or *two-pots*, CSs with different sulfation patterns could be obtained at the end of the semi-synthesis. In particular, a CS polysaccharide possessing sulfate groups randomly distributed between positions 4 and 6 of *N*-acetylgalactosamine (GalNAc) units could be obtained through the *two-pots* route, whereas the *one-pot* pathway allowed an additional sulfation at position 3 of some glucuronic acid (GlcA) units. This difference was ascribed to the stabilization of a labile interglycosidic benzylidene acetal involving positions *O*-3 and *O*-6 of some GlcA and GalNAc, respectively, when the benzylidene-acetylation reactions were conducted in a *one-pot* fashion. Isolation and characterization of a polysaccharide intermediate showing interglycosidic acetal moieties was accomplished.

20

21

- **Keywords**: chondroitin sulfate; sulfation pattern; regioselective sulfation; interglycosidic linkage;
- 22 acetal; benzylidene

23

24

### 1. Introduction

- 25 Glycosaminoglycans (GAGs) are biomacromolecules ubiquitously distributed in extracellular matrices
- and at cell surfaces, with a high biological significance. Chondroitin sulfate (CS), the most abundant
- 27 GAG of the human body, is involved in a myriad of physiological and pathological processes,
- 28 including central nervous system development, signal transduction, morphogenesis, wound healing,
- 29 viral and bacterial infections (Yamada & Sugahara, 2008). From a structural point of view, CS is a
- 30 highly negatively charged polysaccharide, constituted of glucuronic acid (GlcA) and N-acetyl-
- 31 galactosamine (GalNAc), linked together through alternating  $\beta$ -(1 $\rightarrow$ 3) and  $\beta$ -(1 $\rightarrow$ 4) glycosidic bonds.

<sup>&</sup>lt;sup>1</sup> Corresponding author. Tel.: +39-(0)81674153; Fax: +39-(0)81674393. *E-mail address*: <u>ebedini@unina.it</u> (E.Bedini)

#### Download English Version:

# https://daneshyari.com/en/article/7791519

Download Persian Version:

https://daneshyari.com/article/7791519

<u>Daneshyari.com</u>